DOCUMENT RESUME

ED 463 602 EC 308 892

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TITLE Physicians' Knowledge, Training, and Practices in the Treatment of ADHD.
PUB DATE 2001-00-00
NOTE 31p.
PUB TYPE Reports - Research (143)
EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Adults; *Attention Deficit Disorders; Children; Drug Therapy; *Graduate Medical Education; Higher Education; *Hyperactivity; *Knowledge Level; *Medical Education; *Physicians; Training Methods

ABSTRACT

This report discusses the results of two studies that investigated the level and form of training in the treatment of attention deficit hyperactivity disorder (ADHD) among physicians. In the first study, 100 medical schools and 150 residency programs were surveyed nation-wide. Response rates were 62% for medical school and 67% for residency programs. Some training in ADHD is evident; however, differences emerged in hours and format of instruction, with residency programs providing more training opportunities than medical schools. A second study assessed the knowledge, training, and practices of primary care physicians in the diagnosis and treatment of ADHD among 250 primary care physicians in a large, northeastern, tri-state area. A 38% response rate obtained from the initial survey and a follow-up survey sent to non-respondents yielded a 51% response rate. There appears to be considerable general knowledge of ADHD with the majority of respondents being self-taught (76.4%). Whereas fewer than 85% of respondents felt personally qualified to diagnose and provide initial and follow-up medication for ADHD, 93% of the initial sample do prescribe mediations. (Contains 45 references.) (Author/CR)

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Physicians' Knowledge, Training, and Practices in the Treatment of ADHD

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Abstract

This article includes the results of two studies, one on the level and form of training in the treatment of Attention Deficit Hyperactivity Disorder (ADHD) 100 medical schools and 150-residency programs were surveyed nation-wide. Response rates were 62% for medical school and 67% for residency programs. Some training in ADHD is evident, however differences emerged in hours and format of instruction, with residency programs providing more training opportunities than medical schools. A second study assessed the knowledge, training, and practices of primary care physicians in the diagnosis and treatment of ADHD among 250 primary care physicians in a large, northeastern, tri-state area. A 38% response rate obtained from the initial survey and a follow-up survey sent to non-respondents yielded a 51% response rate. There appears to be considerable general knowledge of ADHD with the majority of respondents being self-taught (76.44%). Whereas fewer than 85% of respondents feel personally qualified to diagnose and provide initial and follow-up medication for ADHD, yet 93% of the initial sample do prescribe medications.

Physicians' Training, Knowledge, and Practices in the Treatment of ADHD

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most widely diagnosed conditions used to describe and explain the behavior of children who exhibit behavioral and academic difficulties. Although it is not a new disorder (Barkley, 1990), it is being diagnosed more frequently in recent years than in the past. Discussions of this topic can be found in local newspapers, popular magazines, and the professional literature of many disciplines, including psychology, medicine, and education. Yet, throughout these various sources, discrepancies and confusion exist regarding definition, associated behaviors, diagnosis, and treatment of ADHD. Few medical and mental health professionals can recite the American Psychiatric Association diagnostic criteria for ADHD[1] (Breggin & Breggin, 1995) as delineated in the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) (American Psychiatric Association, 1994). Data indicate that family practitioners diagnose more quickly and prescribe medication more frequently than psychiatrists or pediatricians (NIH, 1998). There is a serious concern about over diagnosis. This may be due in part to the limited time spent making the diagnosis. Some practitioners invalidly use response to medication as a diagnostic criterion, and primary care practitioners are less likely to recognize comorbid (coexisting) disorders. The quickness with which some practitioners prescribe medications may decrease the likelihood that more educationally relevant interventions will be sought. The concern here is the ability and accuracy with which many non-mental health professionals believe they can diagnose and treat ADHD. There is wide variation among types of practitioners with respect to frequency of diagnosis of ADHD. Data indicate that family practitioners diagnose more quickly and prescribe medication

more frequently than psychiatrists or pediatricians. This is of considerable concern since three to nine percent of the children in classrooms throughout our country suffer the symptoms of ADHD (Barkley, 1990; Feifel, 1996; Fowler, 1992).

While the primary care physicians are the first to diagnose ADHD, differences of opinion exist regarding definition, evaluation, and management of children with ADHD (Bennett & Sherman, 1983; Copeland, Wolraich, Lindgren, Milich, & Woolson, 1987; Sandoval, Lambert, & Yandell, 1976). Literature reviews suggest that pediatricians and family practitioners receive minimal and varied training in the area of ADHD (American Academy of Pediatrics, 1985; Weinberger & Oski, 1984) and that assessment and treatment may often differ depending on primary care specialty (Copeland et al., 1987; Wolraich, Lindgren, Stromquist, Milich, & Watson, 1990). The literature for primary care physicians provides varied protocols for assessment, which can lead to inconsistencies in diagnoses (Wolraich et al., 1990) and importantly, a failure to diagnose comorbid conditions (Ouellette, 1991). In addition to varied protocols for assessment, various approaches to treatment have been recommended, with the use of stimulant medication remaining the primary form of treatment employed by primary care physicians. This occurs despite strong recommendations of The American Academy of Pediatrics' (AAP, 1978) Committee on Children with Disabilities and the Committee on Drugs, that if medication for attention deficit disorder is prescribed, it should not be used as an isolated treatment; and further, that there is serious underuse of systematic behavioral treatments (Wolraich et al., 1990) and little attention given to the effective use of other treatment modalities in primary care (Hechtman, 1993).

When children experience behavioral or attentional difficulty, many parents initially turn to their primary care physician for help. Not only are physicians the professionals parents most often talk to about their children, but currently policies of many insurance companies dictate that the physician is the professional that parents *must* first consult. As a result, primary care physicians, both pediatricians and family practitioners, are the first professionals that families seek out when they suspect that their child may have ADHD or are told by the school to have their child evaluated for ADHD (Ross & Ross, 1982).

Given that the primary care physician is typically the first person that parents turn to when their child presents with attentional and/or hyperactive behaviors, and given the varied protocols reported for assessment and treatment of ADHD, it becomes important to understand the expertise that physicians bring to the diagnosis and treatment of this particular disorder. The first purpose of this study is to determine the level of training physicians receive in pediatric residency programs and medical schools in the diagnosis and treatment of ADHD. A second purpose is to assess the training, knowledge, and practices of primary care physicians in order to ascertain whether earlier indicators of variability in assessment and treatment are still prevalent (Hechtman, 1993; Ouellette, 1991; Wolraich et al., 1990).

STUDY I

The 1978 report of The Task Force on Pediatric Education recommended a number of changes in residency training programs. These changes included an increase in the duration of training in general pediatrics to three years and training in: (a) biosocial pediatrics, (b) behavioral assessment, (c) child development, (d) genetics, (e) management of children with chronic

handicapping conditions, and (f) in the "new morbidity " (behavioral problems of preschoolers, inadequate school functioning, and problems relating to adolescents). With the increased demand on pediatricians to diagnose, treat, and manage children with biosocial problems like ADHD, a question remains as to whether medical schools and pediatric residency programs are providing adequate training in this crucial area.

Subsequently, Weinberger and Oski (1984) conducted a survey comparing residency requirements before 1978 and five years after the 1978 Task Force report and found mixed results. Some of the recommendations of the Task Force were implemented, including increased duration of programs, three-year pediatric training programs, and elective rotations in the "new morbidity." However, few programs required experiences in behavioral training, less than half required experiences in adolescent medicine, and specific rotations devoted to handicapping conditions were not required. Wender, Bijur, and Boyce (1992) concurred early this decade that little change has occurred in training in all areas of pediatrics described as "underemphasized" by the Task Force (p. 876). More recently studies by Camp, Gitterman, Headley, and Ball (1997), report a need for increased training during residency in ADHD as well as learning disabilities and school difficulties. That little change has occurred since the 1978 Task Force Report may be a consequence of barriers to further development of behavioral training programs; the lack of funding and lack of appropriately trained faculty in the specialty area of biosocial problems (Zebal & Friedman, 1984).

A number of studies over the past two decades have alluded that primary care physicians and pediatricians are not comfortable or well trained in the management of problems that are

biosocial in nature. In this study, we conduct a national survey of medical schools and residency programs to determine if: (1) training in biosocial and behavioral pediatrics (specifically ADHD) is being offered, (2) whether this training, if offered, is mandated or elective, and (3) the nature and duration of the training.

Method

Participants

A nation-wide, multi-item survey was mailed the curricular Deans of 100 randomly selected medical schools listed in Barron's Guide to Medical and Dental Schools (7th ed.), and to Program Directors of 150 randomly selected university-based accredited residency programs listed in the 1995-1996 American Medical Association Directory.

Materials and Procedures

Medical School Survey. A cover letter asked the Dean to provide answers to items on a one-page survey which asked if the school provided training in ADHD, and if so, whether training was provided through lectures, assigned readings, required rotations, elective rotations, or in other ways (an open-ended option). Additional items asked for the estimated number of hours of training provided overall and whether or not training in ADHD was available across the clinical areas of pediatrics, psychiatry, neurology, and 'other' (open-ended response). A final open-ended question asked respondents to indicate the type of training primary care physicians need in order to effectively diagnose, refer, and/or treat ADHD.

Residency Programs. A cover letter asked the Program Director to provide answers to items on a one-page survey that asked the residency program specialty area (family practice or pediatrics), whether students entered with formal training in ADHD, whether training was provided in

ADHD during residency, and if so, whether training was provided through in-service programs, required reading, rotation in an ADHD clinic or 'other' (open ended). Directors were asked to indicate the number of hours of training in ADHD overall and whether residents leaving their programs would be capable of: discussing ADHD symptoms and treatment, diagnosing ADHD, prescribing medication for ADHD, providing follow-up medication for ADHD, recognizing symptoms as presented by parents, and 'other' (open-ended).

Results

Medical School

Response rate to the national medical school survey was 62%. Overall, 80.65% of the Deans indicated that training in ADHD is provided to medical students in their curricula. The Deans reported that training is provided across a variety of formats, including lectures (66.13% of schools), assigned readings (38.71% of schools), required rotations (37.1% of schools), elective rotations (32.26% of schools), and through small group sessions and/or clinic work (22.58% of schools). The average number of hours of training in ADHD was 3.05 hours (SD = 2.52), with number of hours ranging from 0 to 13 across schools. Particular optional clerkships or clinics that provide training in ADHD included pediatrics (61.29% of schools), psychiatry (64.52% of schools), and neurology (19.35% of schools).

Responses to the open-ended item requesting the type of training physicians need to diagnose and/or treat ADHD stressed: (a) the need for more attention to ADHD in residency programs, (b) a concern that training take place in a clinical setting with supervision by appropriate faculty and not solely in didactic lecture format, (c) the need for physicians to be more familiar with psychological testing procedures and interpretation of test results, (d) the lack of current medical literature on ADHD, and (e) lack of knowledge of adequate referral sources.

A primary concern expressed by the Deans of medical schools was a need for a "team-work" approach to diagnosis and treatment of ADHD. They suggested that interdisciplinary seminars and conferences to address the multidimensional nature of ADHD, which would include specialists in psychology, psychiatry, neurology, and school counseling, would advance physicians' knowledge of ADHD. They further suggested that appropriate diagnosis and treatment requires a multidiscipline evaluation with information provided by the physician, teacher, parents, and school psychologist. Finally, they suggested the importance of working directly with appropriate school professionals in monitoring the effectiveness of medications and behavioral treatment programs. While a collaborative approach to evaluation and treatment was preferred, some Deans indicated that the nature of current insurance structures make collaboration with other specialists difficult in the public sector and cost prohibitive in the private sector.

Residency Programs

The response rate to the residency program survey was 67%. Over 49% of Program Directors reported that residents had received some training in ADHD before they began their residency programs. Directors indicated that 86% of the residents received some training during their residency with the number of hours of training averaging 15.8 (SD = 23.65), with a range of 1-100 hours.

Residency training in ADHD is provided through in-service programs (57% of programs), required readings (36% of programs), rotations in an ADHD clinic (26% of programs), and "other" which included lectures, didactic conversations, and contact with ADHD patients (21% of programs).

Directors suggested that, upon completing the program, residents are prepared to discuss ADHD symptoms and treatment (71% of programs), to diagnose ADHD (69% of programs), to prescribe medication for ADHD (66% of programs), to provide follow-up for ADHD medication and treatment (72% of programs), and to recognize the symptoms of ADHD as presented by parents (67% of programs).

Discussion

As anticipated, a majority of medical schools and residency programs reported that they provide some training in ADHD, with more hours of training provided in residency programs compared to medical schools. Training takes a variety of forms across schools and programs, including lectures, readings, required rotations, elective rotations, in-service programs, and clinic work. It is important to note that there is considerable variability in training across medical schools and residency programs to warrant concern that any one program provides adequate training in the diagnosis and treatment of ADHD. Moreover, the qualitative data from medical school Deans strongly suggest the need for more supervised training in clinical settings, preferably in residency programs, and the need for physicians to be more familiar with psychological testing procedures and interpretation of test results. Their concerns focused on the sparse medical literature on ADHD and lack of adequate referral sources. The Deans emphasized a need to take a multidimensional approach to diagnosis and treatment in collaboration with school psychologists, teachers, and parents, although insurance structures and costs prohibit this approach at present.

Given the relatively few hours of training in ADHD in medical schools and residency programs, it is important to assess what physicians know about ADHD, particularly on the part of those whose practices are focused on the treatment of children. Study II surveyed primary care physicians in a large tri-state metropolitan area who indicated their practice-included children ranging from 0-20 years of age to determine their knowledge, training, and practices in the

diagnosis and treatment of ADHD.

STUDY II

Over the years, several researchers have reviewed the manner in which primary care physicians approach ADHD. Previous studies have documented that in diagnosing ADHD, physicians tend to rely on information provided by the child's parents or on observations made in the physician's office (Copeland et al., 1987, Sleator, 1982; Sleator & Ullman, 1981), on behavioral indicators and medical history (Sandoval et al., 1976), or on symptoms of distractibility, over activity, and impulsivity (Copeland et al., 1987). While the latter study indicates that parents provide most of the information that is used in diagnosis, sometimes information from teachers and psycho-educational evaluations are requested. An important finding was that many pediatricians are still using diagnostic procedures that are questionable, including activity level in the office and responses to stimulant medication. Biederman (1997) reports that physicians tend to make diagnoses of ADHD on the basis of an average 7-15 minute office visit.

The variability in diagnostic factors reported across studies is obvious. Although each of these factors is important to diagnosis, relying on few indicators is inconsistent with professional literature that recommends that information from multiple sources be employed in diagnoses (Barkley, 1990; Feifel, 1996; Goldstein, & Goldstein, 1990). If physicians do not rely on information from multiple sources, the result could be a unidimensional profile of a child and possible masking of the existence of coexisting conditions (i.e., severe emotional problem). Children referred to primary care physicians for attentional difficulties can be suffering from comorbid conditions that may present like ADHD symptomology, and because the ADHD diagnosis is rendered, treatment ignoring the comorbid condition(s) can be less than successful and even harmful (Ouellette, 1991), potentially exacerbating the underlying emotionality. Additionally, a diagnosis of ADHD Predominant Inattentive Type may not be rendered at all if a child does not present as a behavioral problem that draws the attention of parents and teachers. A

multidimensional assessment would provide the opportunity to rule out various physical conditions (e.g., vision, hearing, allergies, neurological), emotional disorders (e.g., anxiety, mood disorder, depression), learning disabilities, and perceptual problems that may present as ADHD but which may render a differential diagnosis (Feifel, 1996).

While multiple treatments are recommended, a small survey in California (N = 48) found that physicians rely primarily on stimulant medication (Sandoval et al., 1976). A national survey found that the most frequently used therapies were stimulant medication and behavior modification (Copeland et al., 1987). A similar survey in the state of Washington (Bennett & Sherman, 1983) concludes that medical specialty and age of the physician account for large differences in the treatment of children with ADHD, with treatments including stimulant medication, behavioral programs, and special diets. As with diagnoses, a multidimensional assessment may indicate a different preferred treatment plan by ruling out the existence of a comorbid condition which would require a treatment approach different from that recommended for a primary diagnosis of ADHD.

Method

Participants

Surveys were mailed to all 250 primary care physicians listed in the directory of the largest HMO in a large, northeastern, tri-state area who indicated that their practice included children ranging from newborn to 20 years of age. A follow-up survey containing three critical items from the initial survey was sent to 156 of the non-respondents one month later.

Materials and Procedures

Physician Survey

A cover letter identified the researchers and indicated the purpose of the study. A self-addressed envelope for easy return accompanied the survey. Respondents were guaranteed anonymity and confidentiality of responses and were given an opportunity to indicate whether they were

interested in receiving the results of the study. Four weeks after the original mailing, a second survey was sent to non-respondents.

The one page survey consisted of 20 multi-part questions. Demographic questions assessed specialty of practice, the year residency was completed, and the percentage of practice comprised of children across five age groups ranging from newborn to 20 years of age. Training was assessed by a question, which asked physicians to indicate where they learned what they presently know about ADHD. Knowledge of ADHD was assessed with 15 true/false items and with an item asking them to indicate which of a number of conditions have comorbidity with ADHD. They were asked what they thought the public school system was/was not obligated to provide to children with ADHD. Finally, a series of questions were asked regarding diagnosis and treatment practices. Asking physicians to indicate the parental concerns that they heard most frequently and rationales accompanying requests for treatment assessed presenting problems. Respondents were asked whether they felt personally qualified to diagnosis and prescribe initial and/or follow-up medication, and if they prescribed medication for ADHD, they were asked to indicate their choice of medication, how they monitor the effectiveness of the medication, and types of evaluations required before prescribing medication. Finally, they were asked if they refer their patients to other specialties for diagnosis, initial, and/or follow-up treatment for ADHD.

Since the length of the survey might have been a determining factor in response rates obtained, a follow-up survey contained items from the original survey which we believed to be critical: source of knowledge, diagnoses, and evaluations required before prescribing medication for ADHD.

Results

Response Rate/Demographics

Of the original survey mailed to all 250 primary care physicians indicating their practice included children ranging from 0-20 years of age, ninety-four surveys were returned, yielding a

38% response rate (N = 94). The average number of years in practice for this sample was 17.34 (SD = 11.52). The follow-up survey containing three critical items from the initial survey yielded a 51% response rate (N = 80), with the average number of years in practice similar to that obtained with the initial survey (15.74, SD = 10.11).

Some respondents did not provide answers to all questions asked. Therefore, frequencies and percentages reported for each of the following survey items are based on the number of respondents who provided answers to those items. In addition, data from the initial and follow-up surveys are combined on three of the items (source of knowledge, diagnosis, and evaluations required before prescribing medication), which were similar to each survey, yielding an overall 69.6% response rate (N = 174) to those items. Sample N's are presented to indicate which items include combined data from both mailings.

Training in ADHD

Source of Knowledge About ADHD. Respondents (N = 174) were asked to indicate how they acquired knowledge of ADHD. They could check one or more of the following sources of information: medical school, residency, conferences, self-taught, or had the option of indicating that they had no information about ADHD. These sources are, of course, not mutually exclusive.

Overall, 9.77% of respondents reported that they acquired some information about ADHD in medical school and 28.74% indicated they learned about ADHD during residency training. A sizable percentage (52.87%) reported gaining information at conferences, although the vast majority of respondents (76.44%) indicated they were self-taught. Only 1.72% reported no knowledge of ADHD.

Whereas the majority of physicians (based on the original sample of N = 94) who had been practicing for 11 or more years indicated that they were primarily self-taught or learned about ADHD attending conferences, a much larger percentage of those who had been practicing for only 1-10 years indicated they received some training in ADHD during residency (see Figure 1). These data suggest increased training in ADHD in residency programs in recent years. However,

these respondents also indicated, similar to those who had been practicing for 11 or more years, that much of what they know was self-taught.

<Fig. 1 here>

Knowledge of ADHD

Respondents were asked to indicate their general knowledge of ADHD by responding to 15 true/false items. There appeared to be considerable general knowledge of ADHD based on the percentage of respondents who answered items correctly. The list of items included factual knowledge of ADHD (e.g., "No known cure exists for ADHD"; 87.23% answered correctly), past views that are no longer upheld by data on ADHD (e.g., "When children with ADHD reach adulthood, ADHD disappears"; 94.68% answered correctly), and misconceptions of ADHD (e.g., "Dietary management is a proven effective treatment for ADHD"; 91.49% answered correctly). A majority of respondents answered most items correctly. Items that were more often answered incorrectly related to the impact and side effects of medication (e.g., "Mediation used to treat ADHD stunts growth"; 71.28% answered correctly, and "ADHD medications help students learn better"; 77.66% answered correctly) and to the frequency of accidents of children with ADHD (e.g., "Children with ADHD tend to have more accidents than non-ADHD children"; 78.72% answered correctly).

Comorbid conditions associated with ADHD. Biederman, Newcorn, and Sprich (1991) suggest that 70% of all children diagnosed with ADHD have comorbid conditions. In order to determine if this is a widely held notion, respondents were asked to indicate whether any of six conditions had a high degree of comorbidity with ADHD. Eighty-four percent of respondents indicated that learning disabilities are associated with ADHD. This perception is supported by reports that at least 20-25% of children with ADHD also have a learning disability (Searight, Nahlik, & Campbell, 1995; Stanford & Hynd, 1994). Sixty-five percent of the respondents believed that conduct disorder is characteristic of children with ADHD. This is interesting in

light of the fact that 20% to 30% of children and 40% to 60% of adolescents with ADHD manifest sufficient signs of antisocial behavior to receive a diagnosis of conduct disorder (Barkley, 1990). Although fewer than 50% of the respondents thought that oppositional defiant disorder has a comorbid relationship with ADHD, approximately 65% of children with ADHD develop sufficient levels of oppositional defiance to be diagnosed (Barkley, 1990). Fifty three percent indicated that adjustment disorder has a comorbid relationship with ADHD, but in fact, most reports do not mention adjustment disorder as an associated condition (Barkley, 1990; Goldstein & Goldstein, 1990). Whereas depression and anxiety were reported to be comorbid conditions by a number of respondents (39% and 41%, respectively), Barkley (1990) has noted that research evidence suggests ADHD is not typically associated with anxiety disorders or depression, although either could occur independently as a primary or secondary condition, particularly with adolescents and adults.

Obligations of the public school system to children diagnosed with ADHD.

Respondents were asked to indicate what public schools are required to provide for children diagnosed with ADHD by checking any of four options. Of those surveyed, 86% believed that the school is obligated to provide something for a child diagnosed with ADHD. Fifty-three percent accurately indicated that the school is not required to provide special education. While children with ADHD may be eligible for special education services, they must meet eligibility criteria as established through federal and state laws (Pennsylvania Bulletin, 1990; Rehabilitation Act of 1973, U.S. Department of Education, 1991; Murphy & Hagerman, 1992). That is to say, a child with ADHD must have a co-existing diagnosis of learning disability, emotional disturbance, mental retardation, or be classified as "other health impaired" in order to be eligible

for special education services (Fowler, 1992; Pennsylvania Bulletin, 1990; Rehabilitation Act, 1973; Murphy & Hagerman, 1992). Unfortunately, 58% of respondents incorrectly indicated the school does not need to provide accommodations under Section 504 of the Rehabilitation Act of 1973 (U.S. Department of Education, 1991; Murphy & Hagerman, 1992). Interestingly, although a majority of respondents took a position on one or both of the regulation items, 34% of the respondents also indicated that they do not know what the school is obligated to provide to children diagnosed with ADHD.

Diagnosis and Treatment of ADHD

Diagnosis: Concerns heard most frequently. Respondents were asked to indicate the five concerns they most frequently hear about children with a potential diagnosis of ADHD. Those most cited included: (a) "can't sit still," (b) "fidgety," (c) "never finishes anything he starts," (d) "can't finish homework," and (e) "grades are poor." Although these were the top five concerns heard, only one of them was heard frequently by over 50% of respondents, "can't sit still" (76%).

Diagnosis: Rationale accompanying request for treatment. Overall, 52% of respondents said that parents request medication to change the behavior of their child more often than they request assistance in helping to improve his or her school performance and grades (41%). Since behavioral problems appear to be highly correlated with school performance, in that the behavioral problems are frequently noncompliant in nature, it might be expected that parents believe that changing behavior will result in improved school performance.

Qualified to Diagnose. Respondents (N = 174) were asked to indicate if they felt they were personally qualified to diagnose ADHD. Overall, 75.29% indicated they were qualified to diagnose with no difference in percentages based on years in practice.

Treatment: Qualified to provide initial and follow-up medication. Overall, 83.33% of the 174 respondents to the initial and follow-up surveys indicated they feel qualified to provide the initial medication to treat ADHD, and 86.78% feel qualified to provide follow-up medication. Overall, 93% of the sample indicated that they do prescribe medication for ADHD, with no differences in percentages of those who prescribe based on years in practice.

Evaluations required before prescribing medication. Respondents (N = 174) were asked to indicate whether they require any of the following before prescribing medication for ADHD: office visit, psycho-educational evaluation, psychiatric evaluation, neurological examination, teacher checklists, parent checklists, and laboratory tests. Responses to these options are not mutually exclusive. The majority of respondents (83.33%) said they require an office visit before prescribing medication for ADHD, along with a psycho-educational evaluation (73.56%). Data suggested a strong reliance on feedback from schoolteachers (70.69%) and parents (69.54%). Few considered a neurological examination necessary (39%), and even fewer felt a psychiatric examination (11.5%) or lab tests (18.4%) were appropriate before prescribing medication.

Choice of medications. Respondents to the initial survey were asked to indicate their first, second, and third choices of medications for ADHD. The majority of respondents provided only a first choice (46.81% did not indicate a second choice and 72.34% did not indicate a third choice). Not unexpectedly, 93% of the time the first choice was Ritalin (methylphenidate). Cylert (pemoline) was the most frequently chosen second choice (19%), followed by Dexedrine (dextroamphetamine) (14%). There were, however, 11 other medications that were selected as second or third choice, including placebo.

Monitor the effectiveness of medication. When asked how they monitor the effectiveness of medication prescribed for ADHD, a majority of respondents said that they rely on office visits (59%), parental feedback, (57%) or teacher feedback (57%).

Referral to another professional and criteria used in making the referral. Ninety-nine percent of

respondents indicated that they have referred children to other professionals for possible diagnosis of ADHD at one time or another. Seventy percent of respondents said they were likely to refer when there is no evidence of desired behavioral change or improvement in school performance. Overall, respondents were most likely to refer to psychologists (33%) or neurologists (29%). Data showed that 41% refer when a child has a negative reaction to one or more medications, and 50% of the respondents indicated they refereed when they are uncertain about combining medications or when a child doesn't respond to typical medications.

Discussion

Study II examined primary care physicians' training, knowledge, and treatment practices for children with ADHD. Overall, the information garnered from this research is initially encouraging. Physicians appear to be generally informed of many factual aspects of ADHD, even those that have been misunderstood until recently. Yet, there remain areas of concern regarding training and practices of primary care physicians.

The primary area of concern is the lack of training physicians receive about this condition. Overall, only a few of the respondents indicated that they received information on ADHD in medical school and/or during residency training. Most primary care physicians are learning about ADHD at conferences or from published material on the topic, but not in arenas where they can benefit from consultation, discussion, and supervision. It is encouraging, however, that the most recently trained physicians report receiving some direct training about ADHD during residency. As suggested by qualitative data reported in Study I, medical school Deans recommend more training on ADHD in residency programs, particularly training under the supervision of a specialist.

There seems to be confusion and misinformation among many of the physicians about issues of comorbidity. It is unclear whether this confusion indicates that respondents are unaware of comorbid conditions and/or whether they do not have a strong knowledge base regarding psychological/psychiatric terms that are used to describe comorbid conditions (e.g., oppositional defiance disorder, mood disorder, depression, and adjustment disorder). Regardless, existence of comorbid conditions can confuse diagnosis and treatment since "many cause symptoms that overlap those of ADHD but require distinct treatment" (Feifel, 1996, p. 210). Similarly, confusion appears when considering data important for a diagnosis. The majority of physicians indicate that parent and teacher checklists are important sources of information to be used in diagnosis and treatment, but few report using them on a frequent basis.

There also appears to be a "disconnect" between developmental or educational (school-based) assessments and health-related (medical practice-based) services (NIH, 1998). There is often poor communication between diagnosticians and those who implement and monitor treatment in schools. Present findings suggest that primary care physicians need to be better informed regarding the educational requirements for children diagnosed with ADHD. Since physicians advise families about suitable treatment, it is important that they possess current information on what programs the schools systems do and do not make available to children with ADHD. Misinformation has the potential to create tension between school officials and a child's family. A great many of the respondents report that they do not have any knowledge about what the public school system is obligated to provide children diagnosed with ADHD. Whereas a majority of the respondents correctly noted that the public school system is obligated to do <u>something</u>, it appears there is still confusion about what the school system actually must do.

A majority of the respondents said that they felt personally qualified to diagnose, prescribe mediation, and do follow-up treatment for ADHD. While aggregate percentages indicate

sufficient factual knowledge about ADHD, one must consider how this translates to individual practice. Based on survey results, it appears that physicians who do not possess up-to-date information or a thorough understanding of this condition are treating many children. For example, almost 30% of physicians reported that typical medication for ADHD will stunt growth, a position not supported by recent studies (Barkley, 1990). A second area of concern involves the respondents' reports of competency to provide medication and actual treatment practices. Whereas 93% of respondents in the initial sample said that they prescribe medication for ADHD, however, only 77.4% of the physicians from that same sample report that they feel competent to do so. This is of significant concern to all of us.

Meanwhile, a recent study by NIH (1998) indicates a lack of consistent improvement beyond the core symptoms and the paucity of long-term studies (beyond 14 months), there is a need for longer-term studies with drugs and behavioral modalities and their combination. Although trials are under way, conclusive recommendations concerning treatment for the long term cannot be made presently. Existing diagnostic and treatment practices, in combination with the potential risks associated with medication, point to the need for improved awareness by the health service sector concerning an appropriate assessment, treatment, and follow-up.

Limitations

Although our findings clarify the lack of medical school and residency program preparations, and highlight the fact that there is a disconnect between the primary care physician's diagnoses and treatment abilities, some important limitations should be noted. The first limitation is our use of a localized survey sample in the physician Study II, and its response rate. The sample was from a highly concentrated tri-state area in the Northeast. The question can be raised as to whether this sample is representative of the national population of primary care physicians, those who practice in different HMOs, or in similar HMOs in other parts of the country. Further

research employing a more geographically diverse sample, which also includes independent practitioners, is required to answer this question. At minimum, this study provides an empirical base from which others might attempt to extend these findings.

Although the initial response rate in Study II was only 38%, this rate is consistent with the response rate of earlier self-report studies assessing physicians' practices with regard to ADHD (Copeland et al., 1987). It is reasonable to assume that the physicians more likely to respond are those who are either sensitive to, or informed about ADHD, relative to those who have no knowledge base of ADHD. The response rate of the follow-up survey raises the overall response rate on three critical items to a more acceptable level (69.6%). Caution is noted, however, that this more acceptable response rate to those items combines two separate surveys completed one month apart. A final limitation is that we relied on self-repot instruments to measure key constructs. As indicative of all self-reports assessment tools: It is impossible to know whether or not physicians actually carry out their reported practices. Therefore, future studies would do well to combine self-report, informant-report, physiological, and behavioral problem measures, as well as interview-based and observational methodologies, in order to more sensitively assess the key constructs in this investigation.

Limitations notwithstanding, this study adds to the growing work of others who have attempted to describe physicians' knowledge, training, and practices in the diagnosis and treatment of ADHD. The emphasis that medical school Deans placed on the need to increase training in residency programs and to require clinically-based experiences under the supervision of specialists gives hope for the future training of primary care physicians in the diagnosis and

treatment of ADHD.

Conclusions

The present data suggest that although primary care physicians have awareness of issues related to ADHD, they have not, in general, achieved a level of knowledge and diagnostic comfort that they would like to have when identifying and treating children with ADHD. Given this lack of congruence in knowledge, training, and practices of primary care physicians, attention needs to be given to training in medical schools and residency programs. Unfortunately, the present data on physician training are consistent with data provided over 20 (American Academy of Pediatrics, 1978), 15 (Weinberger & Oski, 1984), and 5 (Wender et al., 1992) years ago, which resulted in similar recommendations for increased training in biosocial disorders (i.e., ADHD) in medical schools and residency programs. Since, it has not changed, emphasis must be placed on development of medical school and residency curricula that will provide physicians with greater knowledge of ADHD and comorbid conditions, as well as required training in clinical settings. It is hoped that physicians will continue to accrue more information on diagnosis (including familiarity with comorbid conditions) and treatment, and will utilize the expertise of appropriate professionals more regularly when making initial diagnoses and monitoring treatment.

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Figure Caption

Figure 1. Sources of knowledge about ADHD, by years in practice.

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Acknowledgements: The authors wish to thank Patricia Feuertein, Ph.D., for her consultation during initial stages of questionnaire development. Portions of this manuscript were presented at the American Psychological Society Annual Convention in San Francisco, June, 1998, and at the American Psychological Society Annual Convention in Washington D.C., May, 1999.

NOTES

1. Diagnostic Criteria for Attention-Deficit Hyperactivity Disorder in Children

1. Either 1 or 2:

1. Should have 6 or more of the following symptoms of inattention, persisting for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

1. Often fails to give close attention to detail, makes careless mistakes.

2. Often has difficulty sustaining attention in tasks or play.

3. Often does not seem to listen when spoken to directly.

4. Often does not follow through and fails to finish tasks.

5. Has difficulty organizing tasks and activities.
6. Avoids or dislikes tasks requiring sustained mental effort.
7. Often loses things necessary for tasks or activities.
8. Is often easily distracted by extraneous stimuli.
9. Is often forgetful in daily activities.

1. Should have 6 or more of the following symptoms of hyperactivity-impulsivity persisting for at least 6 months to a degree that is maladaptive and inconsistent with developmental level:

1. Often fidgets or squirms when sitting.
2. Has difficulty remaining seated when required to do so.
3. Often runs about or climbs excessively in inappropriate situations.
4. Has difficulty playing quietly.
5. Is often "on the go," acts as if "driven by a motor."
6. Often talks excessively.
7. Often blurts out answers to questions before they have been completed.
8. Has difficulty awaiting turn.
9. Often interrupts or intrudes on others.

1. Onset of some symptoms before the age of seven.
2. Symptoms occur in two or more settings (for example home and school).
3. Clear evidence of significant impairment in social or academic functioning.
4. Not caused by a pervasive developmental disorder, schizophrenia, or any other psychotic disorder, and is not better accounted for by another mental disorder, including anxiety or depression.

In addition, there are three subtypes: (1) Predominantly inattentive type (A1 is met but not A2 for the past six months. (2) Predominantly hyperactive-impulsive type (A2 is met but not A1 for the past six months). (3) Combined type (both A1 and A2 are met for past 6 months).

Diagnostic and Statistical Manual of Mental Disorders: 4th Edition (Text Revision), Washington, D.C., 2000 American Psychiatric Association.

The DSM-IV distinguishes between two types of ADHD, one marked by inattention and the other by hyperactivity-impulsivity. The official standard for ADHD requires any six of the nine items in descending order include:

1. often fidgets with hands or feet or squirms in seat
2. often leaves seat in classroom or in other situations in which remaining seated is expected
3. often runs about or climbs excessively in situations in which it is inappropriate (in adolescents or adults, may be limited to subjective feelings of restlessness)
4. often has difficulty playing or engaging in leisure activities quietly (p. 84)

The first four items in the list for diagnosing the inattention form of the disorder include:

1. often fails to give close attention to details or makes mistakes in schoolwork, work, or other activities
2. often has difficulty sustaining attention in tasks or play activities
3. often does not seem to listen when spoken to directly
4. often does not follow through on instructions and fails to finish schoolwork, chores, or duties in the workplace (not due to oppositional behavior or failure to understand instructions) (pp. 83-84)